

WHAT IS CLAIMED IS:

1. A process for making an autodepositing epoxy-based dispersion, the process comprising the steps of:

- (a) dissolving and/or reducing an epoxy pre-polymer with at least one ethylenically unsaturated monomer to form a mixture;
- (b) dispersing the mixture of step (a) in water with at least one surfactant to form a fine particle dispersion; and
- (c) polymerizing the at least one ethylenically unsaturated monomer contained in the fine particle dispersion to form an epoxy dispersion,

wherein at least one water soluble initiator and/or at least one organic soluble initiator is added prior to step (c) and wherein at least one latent curing agent is incorporated into the mixture before the at least one ethylenically unsaturated monomer is polymerized.

2. The process of claim 1, wherein step (b) comprises the steps of :

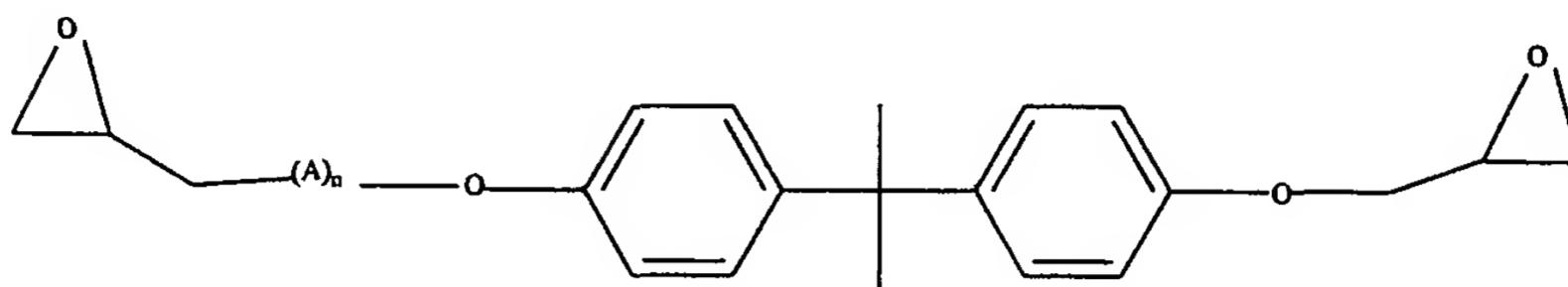
15 dispersing the mixture of step (a) in water with the at least one surfactant to form a crude dispersion; and mechanically dispersing the crude dispersion to form a fine particle dispersion.

3. The process of claim 1, wherein at least one water-soluble initiator is added after step (a) and prior to step(c) and/or at least one organic soluble initiator is added before step (b).

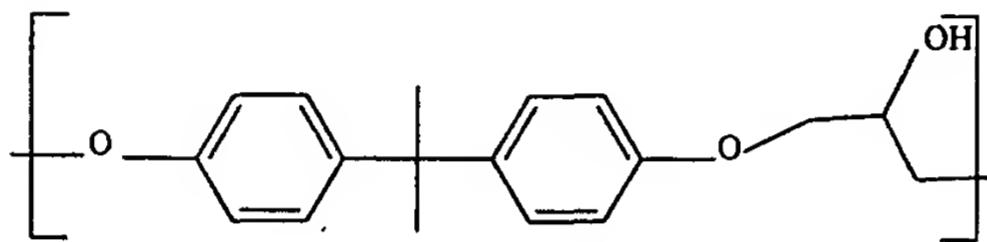
20 4. The process of claim 1, wherein step (c) is carried out by heating the fine particle dispersion.

5. The process of claim 1, wherein the epoxy pre-polymer is derived from epoxy resin prepared by reacting a diglycidyl ether of a polyhydric phenol.

6. The process of claim 1, wherein the epoxy pre-polymer is derived from one or more epoxy resins conforming to the general chemical structure:



5 wherein A is



and n is 0 or an integer from 1 to 50.

7. The process of claim 1, wherein at least one further component is added prior to step (c), wherein the at least one further component is selected from the group consisting of  
10 curing agents, coalescing solvents, leveling agents, and mixtures thereof.

8. The process of claim 1, wherein the at least one ethylenically unsaturated monomer is selected from the group consisting of acrylic acid, methacrylic acid, esters of acrylic acid, esters of methacrylic acid, acrylonitrile, methacrylonitrile, acrylamide, methacrylamide, and styrene.

15 9. The process of claim 1, wherein the at least one ethylenically unsaturated monomer is an anionic functional monomer.

10. The process of claim 9, wherein the anionic functional monomer is a phosphate ester monomer.

11. A process for making an autodepositing epoxy-based dispersion, the process

comprising the steps of:

- (a) dissolving and/or reducing an epoxy pre-polymer with at least one ethylenically unsaturated monomer to form a mixture;
- (b) dispersing the mixture of step (a) in water with at least one surfactant to form a fine particle dispersion; and
- (c) polymerizing the at least one ethylenically unsaturated monomer contained in the fine particle dispersion to form an epoxy dispersion,

wherein at least one water soluble initiator and/or at least one organic soluble initiator is added prior to step (c) and at least one phosphate ester monomer is added after step (b) and prior to or during step (c).

12. The process of claim 11, wherein step (b) comprises the steps of :

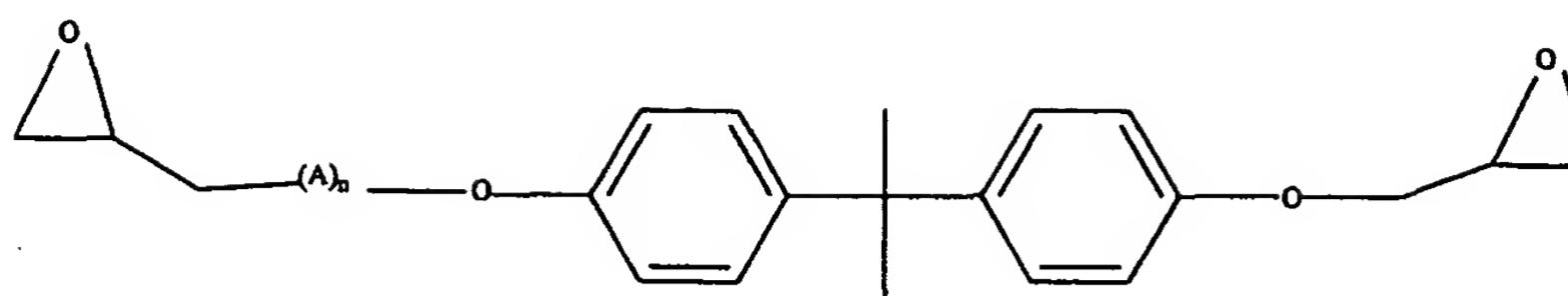
dispersing the mixture of step (a) in water with the at least one surfactant to form a crude dispersion;  
and mechanically dispersing the crude dispersion to form a fine particle dispersion.

15 13. The process of claim 11, wherein at least one water-soluble initiator is added after step (a) and prior to step(c) and/or at least one organic soluble initiator is added before step (b).

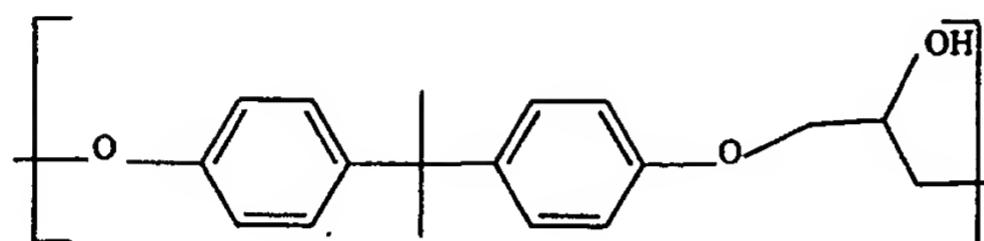
14. The process of claim 11, wherein step (c) is carried out by heating the fine particle dispersion.

20 15. The process of claim 11, wherein the epoxy pre-polymer is derived from epoxy resin prepared by reacting a diglycidyl ether of a polyhydric phenol.

16. The process of claim 11, wherein the epoxy pre-polymer is derived from one or  
25 more epoxy resins conforming to the general chemical structure:



wherein A is



5 and n is 0 or an integer from 1 to 50.

17. The process of claim 11, wherein at least one further component is added prior to step (c), wherein the at least one further component is selected from the group consisting of curing agents, coalescing solvents, leveling agents, and mixtures thereof.

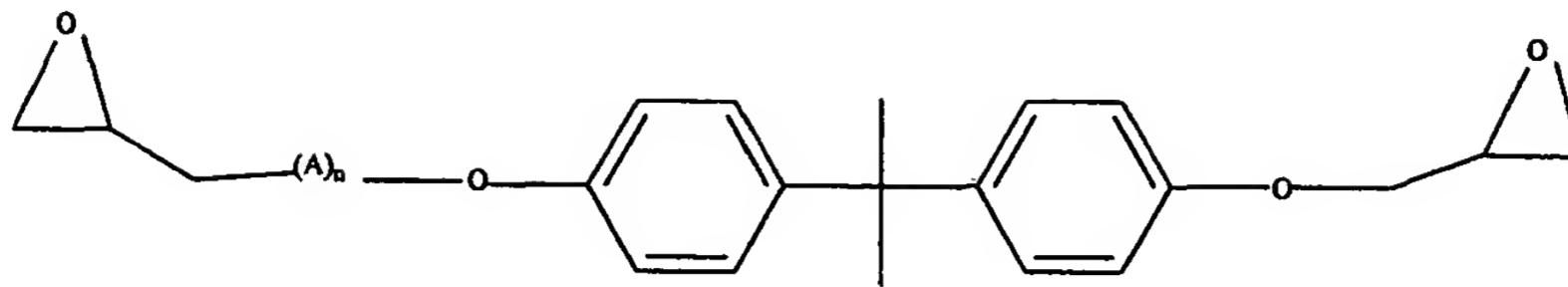
18. A stable autodepositing epoxy dispersion comprising

- 10 (a) an epoxy pre-polymer;
- (b) at least one ethylenically unsaturated monomer polymerized through a heterophase polymerization process; and
- (c) at least one latent curing agent,

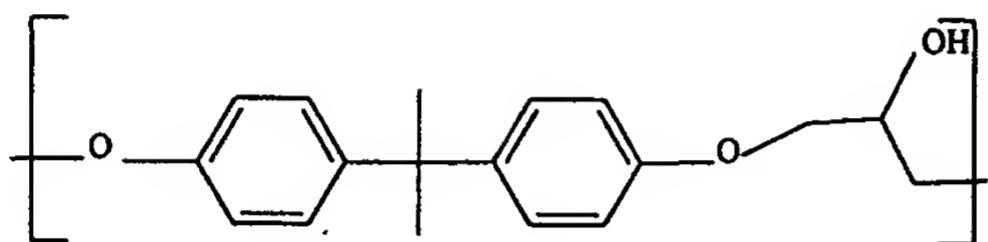
wherein the epoxy dispersion further comprises dispersion particles and components (a), (b), and  
15 (c) are all present in one or more of the dispersion particles.

19. The stable autodepositing epoxy dispersion of claim 18, wherein the epoxy pre-polymer is derived from epoxy resin prepared by reacting a diglycidyl ether of a polyhydric phenol.

20. The stable autodepositing epoxy dispersion of claim 18, wherein the epoxy pre-polymer is derived from one or more epoxy resins conforming to the general chemical structure:



wherein A is



5 and n is 0 or an integer from 1 to 50.

21. The stable autodepositing epoxy dispersion of claim 18, further comprising at least one further component selected from the group consisting of colorants, pigments, coalescing solvents, level agents, and mixtures thereof.

22. The stable autodepositing epoxy dispersion of claim 18, wherein the at least one ethylenically unsaturated monomer is selected from the group consisting of acrylic acid, methacrylic acid, esters of acrylic acid, esters of methacrylic acid, acrylonitrile, methacrylonitrile, acrylamide, methacrylamide, and styrene.

23. The stable autodepositing epoxy dispersion of claim 18, wherein the at least one ethylenically unsaturated monomer is an anionic functional monomer.

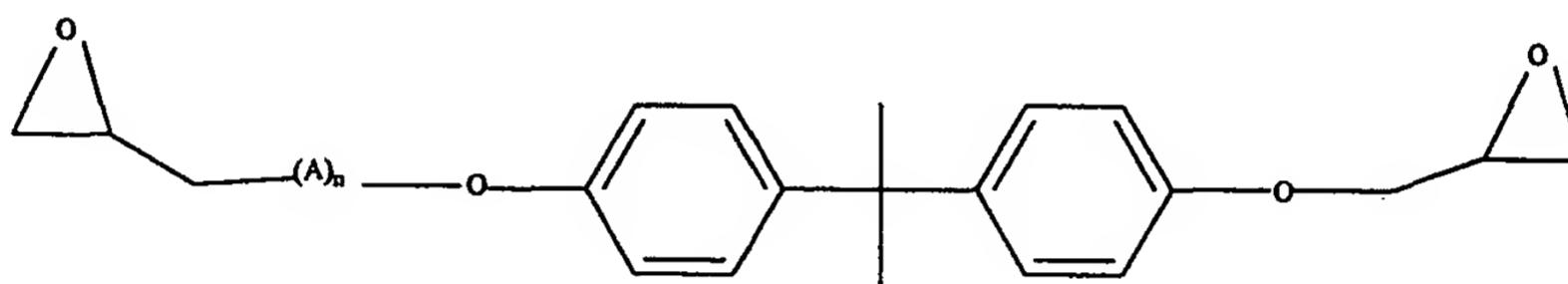
15 24. The stable autodepositing epoxy dispersion of claim 23, wherein the anionic functional monomer is a phosphate ester monomer.

25. A stable autodepositing epoxy dispersion comprising  
 (a) an epoxy pre-polymer; and  
 (b) at least one ethylenically unsaturated monomer polymerized through a

heterophase polymerization process, wherein at least one ethylenically unsaturated monomer is a phosphate ester monomer, and further wherein the epoxy dispersion further comprises dispersion particles and components (a) and (b) are both present in one or more of the dispersion particles.

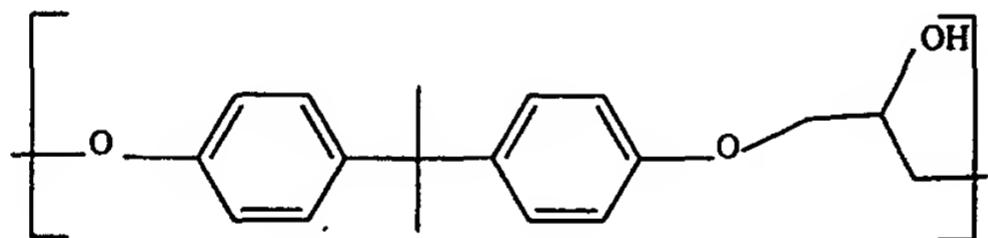
5        26. The autodepositing epoxy dispersion of claim 25, wherein the epoxy pre-polymer is derived from epoxy resin prepared by reacting a diglycidyl ether of a polyhydric phenol.

27. The autodepositing epoxy dispersion of claim 25, wherein the epoxy pre-polymer is derived from one or more epoxy resins conforming to the general chemical structure:



10

wherein A is



and n is 0 or an integer from 1 to 50.

28. The autodepositing epoxy dispersion of claim 25, further comprising at least one 15 further component selected from the group consisting of curing agents, colorants, pigments, coalescing solvents, leveling agents, and mixtures thereof.

29. The autodepositing epoxy dispersion of claim 25, further comprising at least one latent curing agent, wherein components (a), (b), and the at least one latent curing agent are all present in one or more of the dispersion particles.

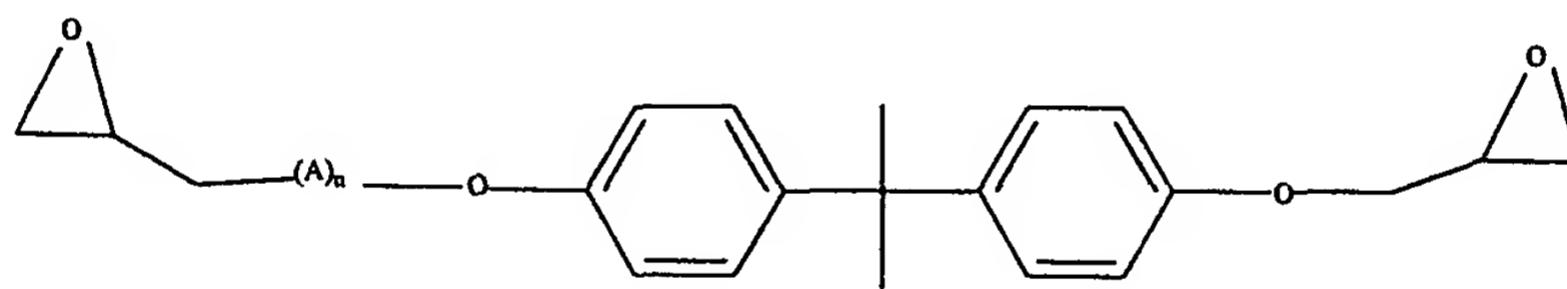
30. An autodepositing coating composition comprising:

- (a) at least one epoxy dispersion comprising: (i) an epoxy pre-polymer; (ii) at least one ethylenically unsaturated monomer polymerized through a heterophase polymerization process; and (iii) at least one latent curing agent, wherein the 5 epoxy dispersion further comprises dispersion particles and components (i), (ii), and (iii) are all present in one or more of the dispersion particles;
- (b) water; and
- (c) at least one autodeposition accelerator.

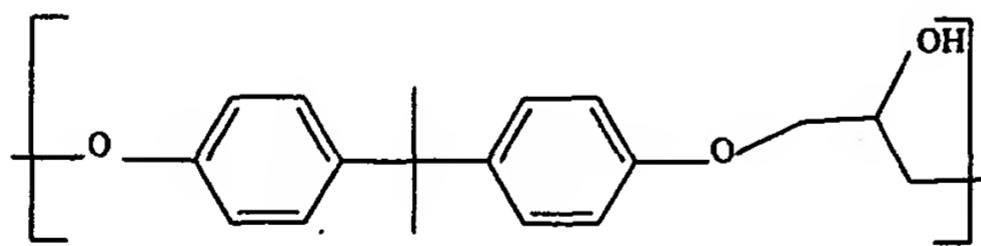
31. The autodepositing coating composition of claim 30, wherein the epoxy pre-polymer

10 is derived from epoxy resin prepared by reacting a diglycidyl ether of a polyhydric phenol.

32. The autodepositing coating composition of claim 30, wherein the epoxy pre-polymer is derived from one or more epoxy resins conforming to the general chemical structure:



15 wherein A is



and n is 0 or an integer from 1 to 50.

33. The autodepositing coating composition of claim 30, further comprising at least one further component selected from the group consisting of colorants, pigments, coalescing

solvents, leveling agents, and mixtures thereof.

34. The autodepositing coating composition of claim 30, wherein the at least one ethylenically unsaturated monomer is selected from the group consisting of acrylic acid, methacrylic acid, esters of acrylic acid, esters of methacrylic acid, acrylonitrile, 5 methacrylonitrile, acrylamide, methacrylamide, and styrene.

35. The autodepositing coating composition of claim 30, wherein the at least one ethylenically unsaturated monomer is an anionic functional monomer.

36. An autodepositing coating composition comprising:

(a) at least one epoxy dispersion comprising (i) an epoxy pre-polymer and (ii) at 10 least one ethylenically unsaturated monomer polymerized through a heterophase polymerization process, wherein the epoxy dispersion further comprises dispersion particles and components (i) and (ii) are both present in one or more of the dispersion particles;

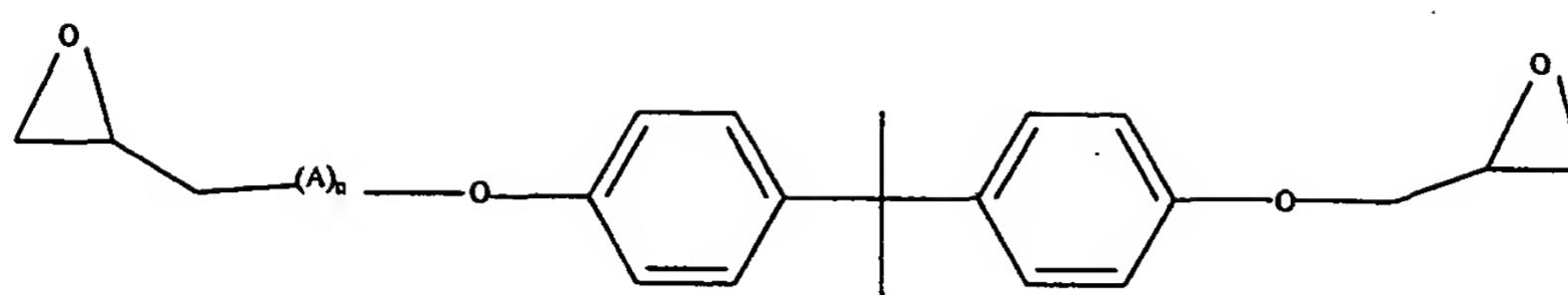
(b) water; and

15 (c) at least one autodeposition accelerator.

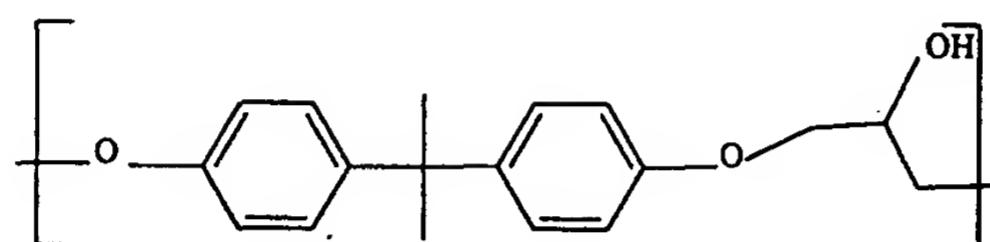
37. The autodepositing epoxy-acrylic coating composition of claim 36, wherein at least one of the ethylenically unsaturated monomers is a phosphate ester monomer.

38. The autodepositing coating composition of claim 37, wherein the epoxy pre-polymer is derived from epoxy resin prepared by reacting a diglycidyl ether of a polyhydric phenol.

20 39. The autodepositing coating composition of claim 37, wherein the epoxy pre-polymer is derived from one or more epoxy resins conforming to the general chemical structure:



wherein A is



5 and n is 0 or an integer from 1 to 50.

40. An stable autodepositing epoxy dispersion produced according to the process of  
claim 1.

41. An autodepositing coating composition comprising:

- (a) at least one epoxy dispersion produced by the process of claim 1;
- 10 (b) water; and
- (c) at least one autodeposition accelerator.